Concrete and Bentonite Replace Sheet Piling in Deep Excavations

Advantages of Italian system include lower cost, avoidance of noise and vibration, and stronger, more impervious walls

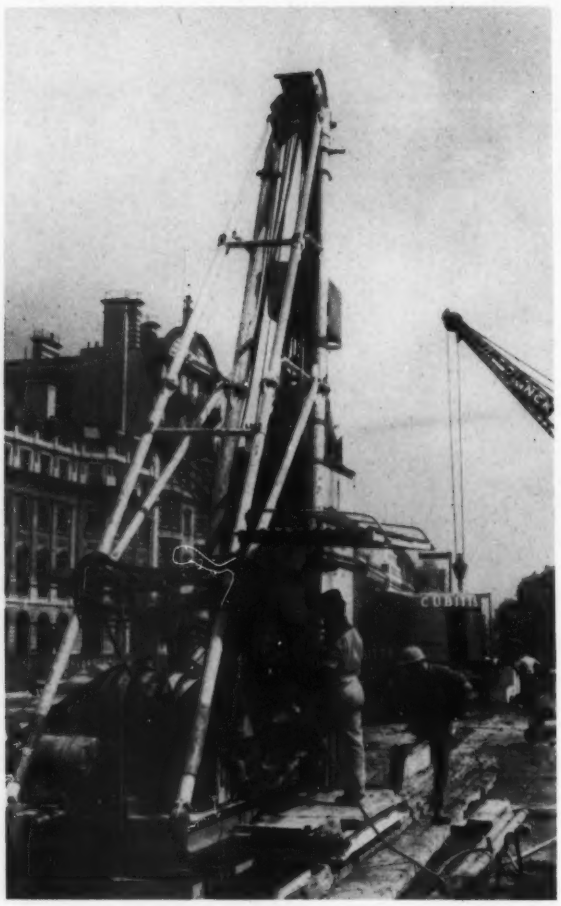
AN ITALIAN FIRM, the Impresa Construzioni Opere Specializate, has long been known in Europe as a specialist organization for dealing with foundation and soil problems. Its activities cover the full range of soil studies, including investigation, treatment to improve bearing capacity and permability or to provide impervious barriers against seepage, and the design and completion of difficult foundation and drainage jobs in reinforced concrete. Difficult excavations are also a specialty. All of this specialist knowledge has recently been combined in the development of a new system which allows the use of site-cast reinforced concrete instead of driven sheet piling in the construction of underpass retaining walls prior to the main excavation. The result is a stronger, permanent, impervious wall with a number of impressive advantages.

The first stage of the method is to excavate, along the line of the desired retaining wall, a trench about 3 feet wide and 5 feet deep. The sides and edges of this trench are lined with concrete to provide a stable working surface, which reduces the effective trench width to around 20 inches or a little more. Before excavation for the desired depth of wall begins, the trench is filled, for the length of the excavation, with a slurry of bentonite.* A special narrow guided clamshell bucket, which can cut for the full 20-inch free width of trench and has no protrusions on the hinged ends, is then used to excavate to the required depth of the underpass.

Excavation usually proceeds to give retaining wall in sections 16 feet long, four direct vertical cuts to the full depth of wall being made, rather than excavating over the entire 16-foot length. These column cuts are made in two sections of 4 feet 6 inches with two intermediate columns of 3 feet. This method has been found to be most economical with the equipment used. It also, as will

*Bentonite is a volcanic clay mainly used as a suspension in water for the drilling of oil wells to stabilize the bore.

Reinforcing steel in place for the base slab of an underpass in London. The ICOS reinforced concrete retaining wall is visible behind the vertical steel.



An ICOS excavating rig at Hyde Park Corner, London.

be explained later, facilitates the transition of operations from one section of wall to the following one. The level of the bentonite slurry sinks as earth is removed, and in so doing stabilizes the soil exposed in the walls of the trench. Depths of 40, 50 and even 60 feet are regularly dug out in this way. The consistency of the bentonite slurry can be adjusted to give greater or less penetration and stability, depending on the soil type.

While the trench is held open by the bentonite, the final stages of the retaining wall construction can be completed. Prefabricated cages of reinforcement are lowered into position and placing of the concrete proceeds as for underwater concreting by tremie pipe from the bottom upwards. The concrete placed in this way displaces the remaining bentonite slurry, the level of which rises accordingly. As the level reaches the top of the trench, the slurry is allowed to flow over into the next section of wall, which is already being excavated. Excavation of this following section begins at the end remote from the section in which concrete is being placed; a length of steel pipe of the necessary height is placed between the soil to be removed and the bentonite-coated excavation to provide a temporary joint. This pipe prevents contamination of the mix which might result in a line of weakness due to soil inclusions; it is readily withdrawn to facilitate complete removal of the soil remaining in the last column of the excavation.

The main excavation for the underpass or subway can commence as soon as each opposing pair of retaining wall sections is complete. As the retaining wall surfaces are exposed, temporary horizontal steel struts are installed at levels predetermined to give minimum interference with final concreting. Three such struts are usually sufficient—the first about 5 feet below grade, the third or lowest about 10 feet above the road surface of the underpass, and the middle one about 16 feet above the level of the lowest strut, the distance between struts being variable.

The first stage of the final concreting operations is to place the base or roadway slab; the lowest strut is then removed and reinforcement and concrete placed for the wall of the underpass up to about mid-height. If the underpass is simply an open cut, the last strut can then be removed and the wall finished to grade. If a top or cover slab is needed, the last retaining wall strut is interchanged with the slab falsework and construction and placing proceed normally; waterproofing of the slab and back filling complete the project.

The ICOS system is at present being used for two major traffic improvement projects in the heart of London, England. Four of the rigs are in use to provide 168,000 square feet of retaining wall for the $15,000,000 contract. Consumption of bentonite for the walls is expected to reach 1,500 tons. The normal depth of wall excavated is 40 feet with 50-foot depths in some areas. The whole project involves some 3,000 feet of underpass and open approaches.

The ICOS method was chosen for the London job on the basis of its two outstanding advantages over driven sheet steel piling: lack of noise and lack of vibration. The avoidance of noise was a major factor since most of the work is in the vicinity of a large hospital where pile driving is forbidden by city regulations. In this heavily built-up area vibration could play havoc with sewers and services and existing foundations. A further advantage is, of course, the impermeability of the retaining wall, which means that the main excavation and construction can proceed rapidly and safely below ground water level. The wall can also follow the profile of impervious underlying strata and can cross below-grade obstacles without difficulty.

The Italian inventors are developing their process for use with retaining walls and below-grade structures of curved and other shapes. Uses visualized are for building foundations, bridge piers, canal walls, deep wells and mine shafts. END

Polystyrene Form Linings

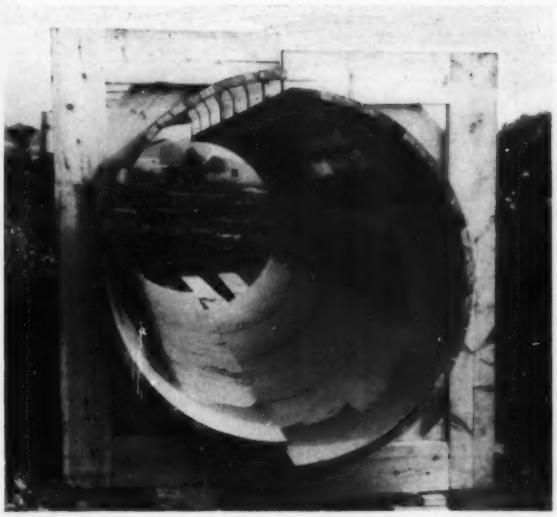


FIGURE 1

BRITISH CONTRACTORS are now using polystyrene sheets as formwork lining for exposed site-cast concrete. The practice has been adopted on two counts: one, the high gloss of the sheet gives a surface finish to the concrete which is exceptionally smooth and entirely blemish-free; and two, the lack of adhesion of polystyrene to concrete dispenses with the need for form oil. The lining material is shaped by moderate controlled heating and glued in position. Sheets are 0.06 inch thick.

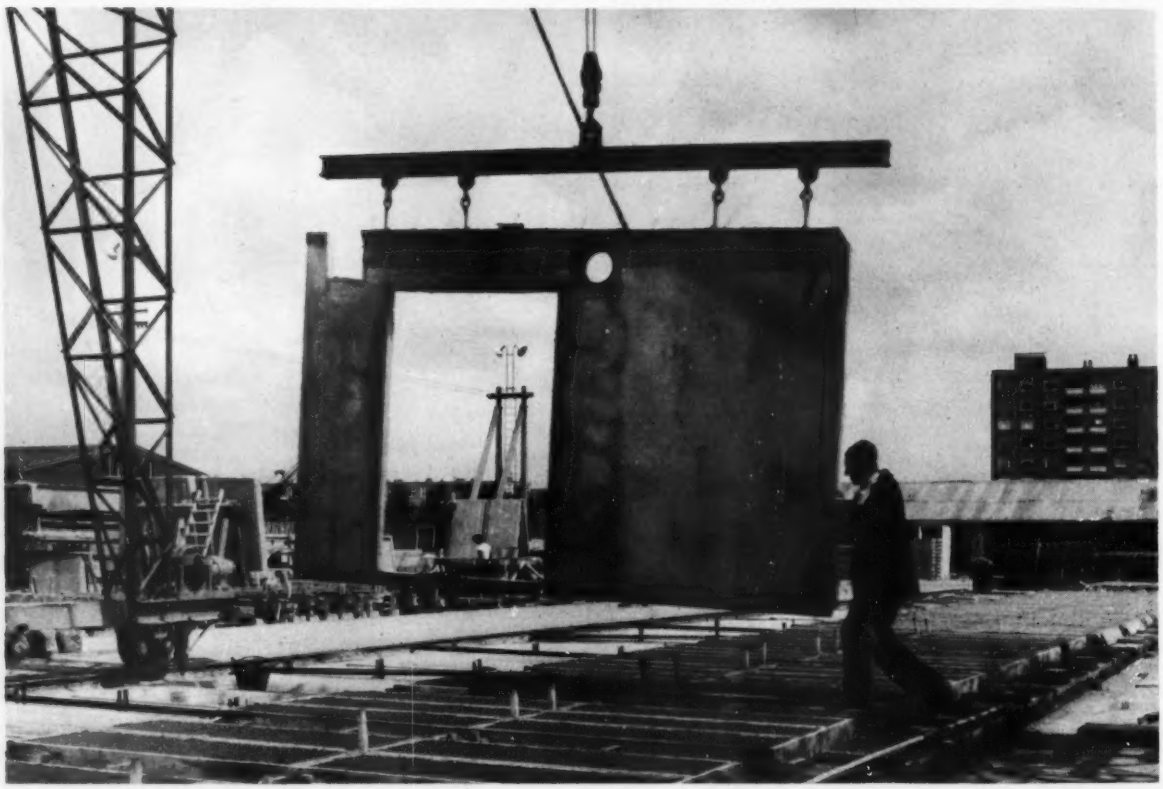
The photographs show a typical use of polystyrene-lined forms for the support columns for an overpass on a highway project. Each column is 14 feet high and 4 feet 6 inches in diameter. The lined form was constructed in two halves (Figure 1), and clamped around the reinforcement. The same form was used for all columns, and stripped (Figure 2) after 24 hours. END

FIGURE 2

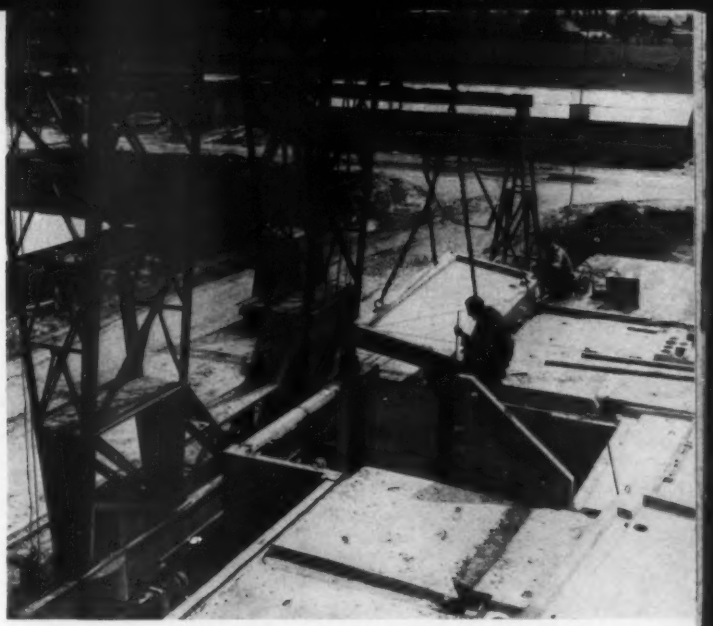
FILE: Forming

Site Precasting Has Advantages For Apartment House Construction

A completed wall element being removed from the production area for stacking. Three weeks is the normal time lapse between stripping and erection of the unit.



Dutch contractor sets up casting yard on the building site to combine the best features of precast and site cast concrete



Here one of the gantry cranes, controlled by the man on the right, is lowering a balcony floor element into place.

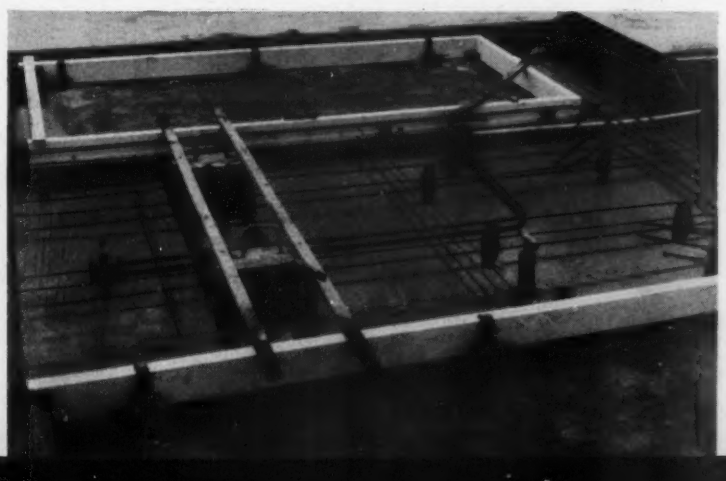
IN EUROPE the use of large precast elements for apartment block construction, if not exactly common, no longer rouses any very great interest. A number of concrete products manufacturers now specialize in the supply of building units (floor slabs, wall elements, steps, beams, trusses) in sizes which are the maximum practicable within transportation and erection limits. A Dutch contractor has now gone one step further and taken his precasting yard to the site, reasoning that site precasting combines the advantages of both precast construction and flexible site operation. Normal job savings are said to be a good 5 percent over conventional plant precast construction, although it is acknowledged that the design of the building has considerable influence on this figure.

One important consideration in this development is that plant precasting must inevitably involve a large degree of standardization, whereas the concrete contractor is traditionally free to adapt himself to the client's wishes. In other words an architect or designer using plant precast construction is always bound, to a greater or lesser degree, by the products that he has chosen to use. The site precaster says to the client, in effect: "You go ahead and design the building, we'll find some way of precasting it." This means that the designer has full freedom in choice of room sizes and layouts, and, what is often a very important factor, in choice of cladding medium. In multiple-family housing the question of visual appearance often exerts the greatest influence on whether a design is accepted or not.

The Dutch contracting firm of Gembouw operates as a sideline a small products plant in Rotterdam from which they supply the general market and, where feasible, their own construction projects. Their main line is, however, the site precasting system with which they bid for contracts throughout Holland. The system is ideal for the purpose it fills, namely construction of apartment housing in blocks not exceeding four stories, the maximum height for which elevators are not considered essential. Such projects are invariably planned for completely open country and the number of blocks can easily run to a hundred at a time.

Once a contract has been awarded Gembouw opens up a precasting yard. Frequently it is possible to use the open spaces of a future plaza or certain sections of the road layout, for casting operations. The kingpin of construction is the gantry crane, running on rails.

Several of these cranes may be needed for large projects; they are used to serve the precasting yard and to erect the concrete elements. Trans-



The formwork for a typical wall element ready for casting. Note the electric conduit has already been placed.

LEFT: Here dense concrete ribs are being compacted between already hardened lightweight concrete panels to produce large floor elements.

LOWER LEFT: In the erection of this wall unit, sand cement mortar is being rammed into the joint between slab and wall to approximate monolithic construction.

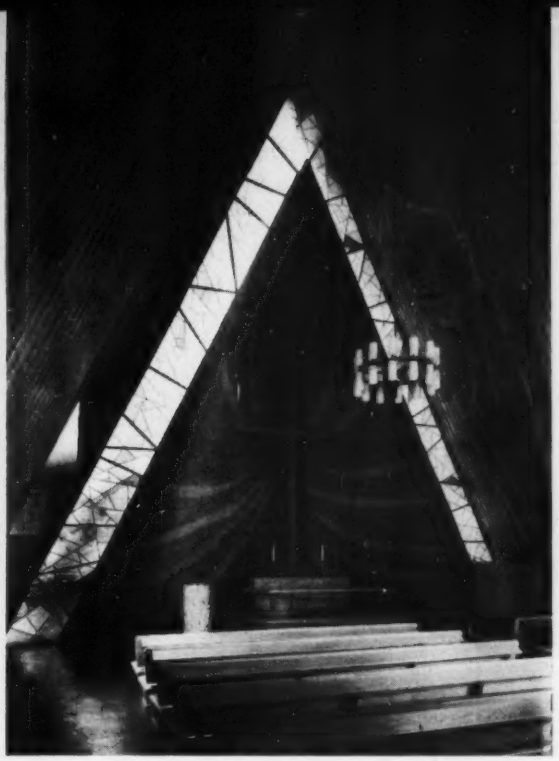
This completed Gembouw building is partially clad with the traditional red Dutch brick. Other buildings have been clad with exposed aggregate and colored concrete panels, tiles, aluminum, glass and terrazzo.

portation plays an important role on these projects; where distances between casting and erection become too great, the precast units are loaded on steel-wheeled cars by the gantry crane in the casting area and dragged to the erection area for unloading directly into the building by another gantry crane. The entire car can also be lifted by gantry crane from one track to another or, if necessary, onto a truck or trailer. Maximum loadings are between 12 and 15 tons.

The gantry cranes themselves straddle the full height of a 4-story apartment block. Capacity is 3 tons. Unless two cranes are used at once, this is the maximum weight of a unit to be precast. All cranes have remote push-button control operated by one of the installing crew. In general a block of 24 apartments can be erected by five men in four weeks.

Depending on the size of the project, its location and various other factors, Gembouw uses both ready mixed and site mixed concrete for casting production. Essentially only two mixes are employed—one of normal weight concrete (6½ sacks per cubic yard) and one of lightweight concrete (weight 45 pounds per cubic foot). Internal walls within an apartment, and also the internal leaf of double-leaf walls, are cast of lightweight concrete. Normal concrete is used for walls between apartments, solid external walls, staircase housings, balconies and steps. Floors are of composite construction consisting of lightweight panels and normal concrete ribs. The maximum width of floor unit placed is usually 7½ feet; the weight of the composite floor slab averages 55 pounds per square foot.

All units are cast within a tolerance of 7/16 of an inch. Fittings are cast directly into the concrete whenever this is possible. Curing is restricted to water spraying over wet burlap. Normally the units are left to harden for two days before being removed from the production area. They are then stacked for three weeks before being erected into the building. In this way it is possible for the casting crew to keep well ahead of the erection crew and also to avoid excessive in-place shrinkage. To achieve monolithic construction all units are tied together during erection by means of projecting reinforcement. The joints are then rammed solid with a sand/cement mortar. END



Interior view of the Bakkehaugen Church in Oslo shows some of the interesting concrete surface textures created by sandblasting. The wall murals were drawn right on the concrete surfaces by blasting some areas and leaving other areas untouched. Even the cross, the altar, the pulpit and the baptismal font are of Naturbetong.

In this impressive modernistic concrete mural, colored glass was substituted for aggregate to produce a mosaic crib through which exterior light can filter. The ribbed effect adjacent to the figure of Mary is the result simply of protecting alternate strips of the concrete from the sandblasting.

From Norway . . . exposed aggregate concrete murals by sandblasting

THE ACCOMPANYING ILLUSTRATIONS show some of the striking mural-like effects achieved by exposing the surface aggregate of concrete using a sandblasting technique called Naturbetong developed in Norway. The examples pictured provided almost the entire interior and exterior decoration for a modern church in Oslo.

To assure the desired and quite essential uniformity of the exposed aggregate surfaces, the concrete is cast by an intrusion or injection process in which the coarse aggregate (plus ¾ inch) is placed in the forms and consolidated before the introduction of a sand-cement mortar. The mortar is usually injected through pipes placed in the forms and gradually pulled upward as the voids are filled.

After the concrete has set, but before hardening progresses too far, the forms are stripped and sandblasting is started at once. Depending on atmospheric conditions, the interval between injecting the mortar and stripping the forms may range from 10 to 30 hours.

When the forms are removed, the surface of the concrete is completely smooth with characteristics of the mortar which has been used. It can either be gray or white or any other color imparted by the addition of iron oxide pigments. Finally, when the comparatively soft mortar is removed by sandblasting, the coarse aggregate appears immediately, to a greater or lesser extent, depending on the force of the blasting.

As the pictures suggest, a wide range of surface textures may be produced with this technique through such devices as sandblasting to various depths, through the use of colored mortars, and by utilizing aggregates of varying size and shape. It is also claimed that because of the consolidation of coarse material as a separate operation, the exposed surfaces of the aggregate are unfailingly in a true plane.

The method seems to offer good possibilities for a new expression of art. When handled by an artist, the sandblasting machine becomes an artist's tool comparable to the pencil and the engraving needle.

The surfaces produced with the Naturbetong technique may be patched quite easily, although the almost complete absence of random voids reduces the need for patching to the minimum. Construction joints and lift marks may also be concealed with considerable ease. END

REMOVING STAINS FROM CONCRETE

BECAUSE OF THE VERY NATURE OF THE MATERIAL, and the limitless variety of the exposure conditions to which it is subjected, one of the commonest esthetic faults to be found with concrete is its affinity for various agencies which cause staining. It's a rare concrete structure indeed that isn't marred in some measure by not just one but a number of stains having entirely different origins.

Fortunately it is not necessary to be either a chemist or a magician to remove most stains relatively easily. Basic work on this subject was done by D. W. Kessler of the U. S. Bureau of Standards for marble surfaces; many of his findings have been suitably adapted to the somewhat different surface texture of concrete by D. Harrison of the Hydro-Electric Power Commission of Ontario. Well defined methods are now available to remove effectively most stains on concrete which result from exposure to materials commonly found on construction sites or used in buildings.

REMOVING SPECIFIC STAINS

Copper. The green stain which is created when water flows over exposed copper or bronze is a common sight on masonry structures. The discoloration can be removed as follows: Mix thoroughly, in the dry state, 1 part by weight of dry powdered ammonium chloride and 4 parts by weight of a suitable filler such as diatomaceous earth. Form a smooth paste by adding ammonia water. Apply a layer of paste ⅛ to ¼ inch thick over the stained area; do not remove until dry. Three such applications are usually sufficient to remove even the most severe stains.

Rust. Rust stains on concrete are common; they usually result from the weathering of unpainted or unprotected structural steel. The materials needed for removal of rust stains are: one ounce of sodium citrate dissolved in 6 ounces of water; crystals of sodium hydrosulphite; paste of whiting and water. Apply the solution by brush at 5- to 10-minute intervals until the area is thoroughly soaked. Next, if the stain is on a horizontal surface, sprinkle it with the crystals of sodium hydrosulphite and then cover it with the paste. For a vertical surface take the paste on a trowel, sprinkle it with the crystals and plaster over the area, keeping the crystals in direct contact with the stain. A single application of this treatment is usually adequate.

Linseed Oil. With any oil spillage it is best to take immediate steps to remove as much of the oil as possible by sucking it up into an absorbent material such as hydrated lime, whiting, powdered talc or portland cement. This treatment should be continued with fresh applications of the absorbent until all the free oil has been taken up. Care is obviously necessary when removing the soaked absorbent to avoid spreading the stain. The surface can then be treated with minimum effort and expense, and maximum effectiveness.

The procedure is as follows: Mix thoroughly 1 part of trisodium phosphate, 1 part of sodium perborate and 3 parts of powdered talc. Add liquid green soap or a strong solution of soap in hot water to form a paste. Cover the stain with a ⅛-inch layer of the paste, remove the paste when it is thoroughly dry, and scrub the surface with clean water. Application should be repeated as frequently as necessary. The dry paste can be reused a number of times by remixing it with soap solution or liquid green soap. The method is effective even with a heavy coating of hard glossy oil.

A second method of removing linseed oil stains, which is somewhat simpler, but less effective, consists of covering the area with two layers of cotton batting. The first layer, in direct contact with the stain, should be soaked in hydrogen peroxide, the second in ammonia. The effectiveness of the two methods can be judged from Figure 1.

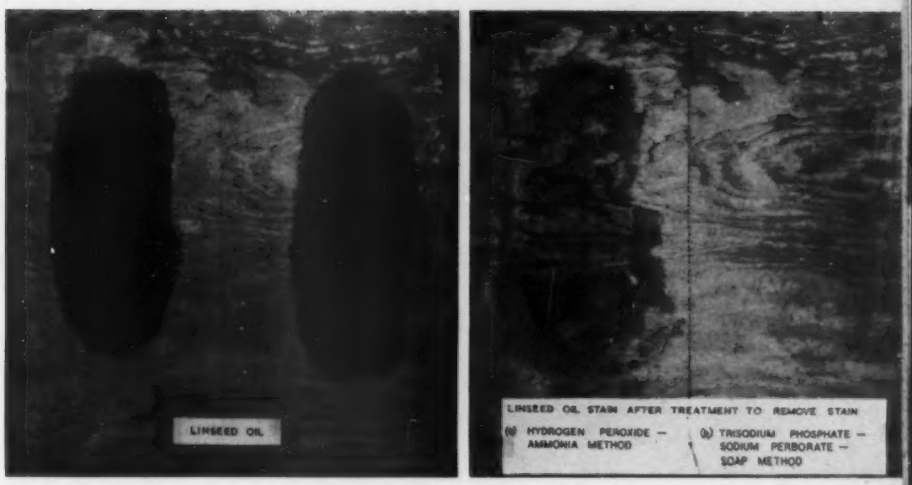

LINSEED OIL
LINSEED OIL STAIN AFTER TREATMENT TO REMOVE STAIN
(a) HYDROGEN PEROXIDE — AMMONIA METHOD
(b) TRISODIUM PHOSPHATE — SODIUM PERBORATE — SOAP METHOD

Figure 1. These before and after pictures indicate the relative effectiveness of two different treatments for the removal of linseed oil stains.

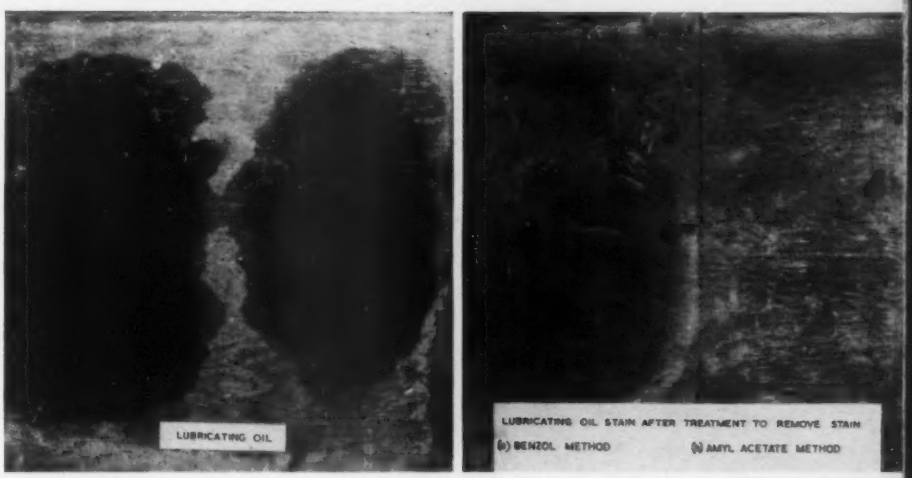


Figure 2. Lubricating oil stains removed by two different methods.

Petroleum Oils. An absorbent application is also recommended for liquid oils. Oils which have solidified should be scraped off as much as possible and the area scrubbed clean with a strong soap solution, scouring powder or trisodium phosphate; these will remove most of the free oil. The most practical method of removing the stain is then as follows: Make a paste of a suitable solvent, such as benzol, and an inert powdered filler (hydrated lime, whiting or talc). Apply the paste to the area and allow it to remain in position for one hour after all solvent has evaporated. Repeat as necessary.

A less practical but equally effective method can be used for small areas or floors. It consists of covering the stain with a ¼-inch thick mat of asbestos fiber, soaking the mat in amyl acetate, and placing a heated concrete slab on top of it. The effectiveness of these two methods is demonstrated by Figure 2.

Grease. Since grease will not normally penetrate very far into good dense concrete, scraping and scrubbing are usually effective. Any stain remaining can be removed by a benzol solvent paste application as for petroleum oils. The use of free solvents should be avoided since these only tend to increase the degree of penetration.

Asphalt. Of all stains those caused by asphalt are the most difficult to remove, especially if the asphalt has been allowed to penetrate very far into the concrete. The type of asphalt also has great influence on the degree of staining. Careful and vigorous mechanical pre-cleaning by scraping and scrubbing are essential before attempting to treat the surface chemically.

Petroleum asphalt can be removed satisfactorily by cooling the area with ice until the asphalt is brittle, and then chipping the stain away with a chisel and scraping the surface clean. A final

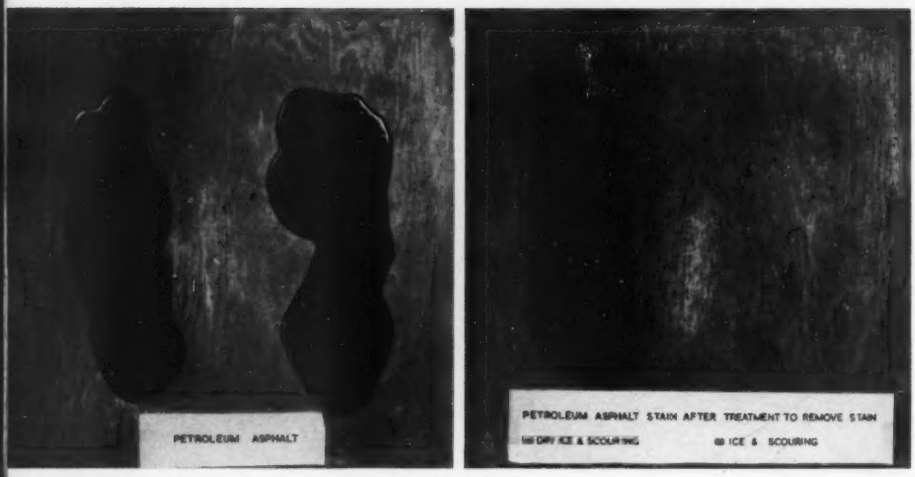


Figure 3. The removal of petroleum asphalt spillage is tedious and time-consuming, but good results are possible with ice and scouring treatment.

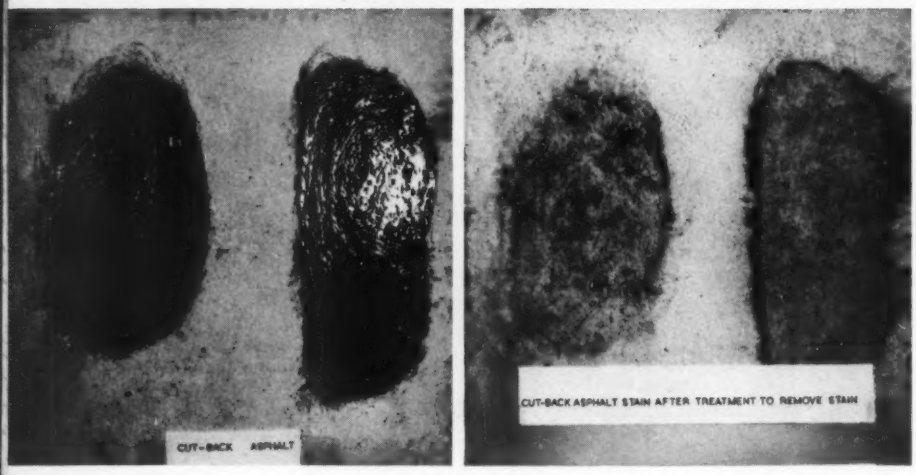


Figure 4. Complete removal of cut-back asphalt stains is generally impossible. These pictures show average results obtainable.

scrubbing with an abrasive scouring agent completes the treatment. As can be seen from Figure 3, ordinary ice is more effective than dry ice. Obviously the method is tedious and time-consuming and hardly economic for large areas. It would also seem to be more practical to use it in winter.

Emulsified asphalt can be removed satisfactorily by scrubbing alone. Any use of solvents either in liquid or paste form increases penetration to the point where removal is impossible.

Cut-back asphalt (for example petroleum asphalt cut back with linseed oil) is nearly impossible to remove. Figure 4 shows areas treated by repeated applications of the benzol paste followed by scrubbing with scouring powder. The result is a considerable improvement but definitely not fully satisfactory. Other methods have proved even less effective.

Wood Tar and Smoke. Concrete slabs and walls are perhaps most frequently stained by the effects of fire. The resulting dense black stain is easily and quickly removed by scrubbing with scouring powder and water followed by the application of a cloth soaked in a bleaching agent such as a commercial solution of sodium hypochlorite.

Creosote. The benzol paste treatment followed by scouring is rapid and effective.

Paint. Dried paint films can be removed satisfactorily (Figure 5) by most commercial paint removers. The remover should be applied liberally to the area and allowed to penetrate the film for a few minutes; gentle scrubbing will then loosen the film and allow it to be peeled or washed off. Any residue can be scrubbed off with scouring powder.

Paint removers should not be used on freshly-

spilled paint or films less than 3 days old, since they only tend to increase penetration into the surface. Absorption with soft cloth or paper towels, followed by vigorous scrubbing, is recommended.

Inks. In office buildings, inks (which are of a more varied and difficult chemical composition than one might suppose) are frequently splashed over concrete. The only effective treatment is to try to bleach the affected area. This can be done with any commercial bleaching agent (e.g., sodium hypochlorite solution). Three techniques are possible: (1) flooding the area with the bleaching solution; (2) saturating pieces of clean white cloth with the bleach and pressing them against the surface by means of a sheet of plate glass or clean wood; or, (3) applying a paste made from the bleach solution and powdered talc.

If such bleaching is not entirely effective and a brown stain is still visible, this can be removed by the technique given for rust stains. Similarly a residual blue or blue-black stain can be eliminated by an additional bleaching with a solution of ammonia water.

GENERAL PROCEDURE

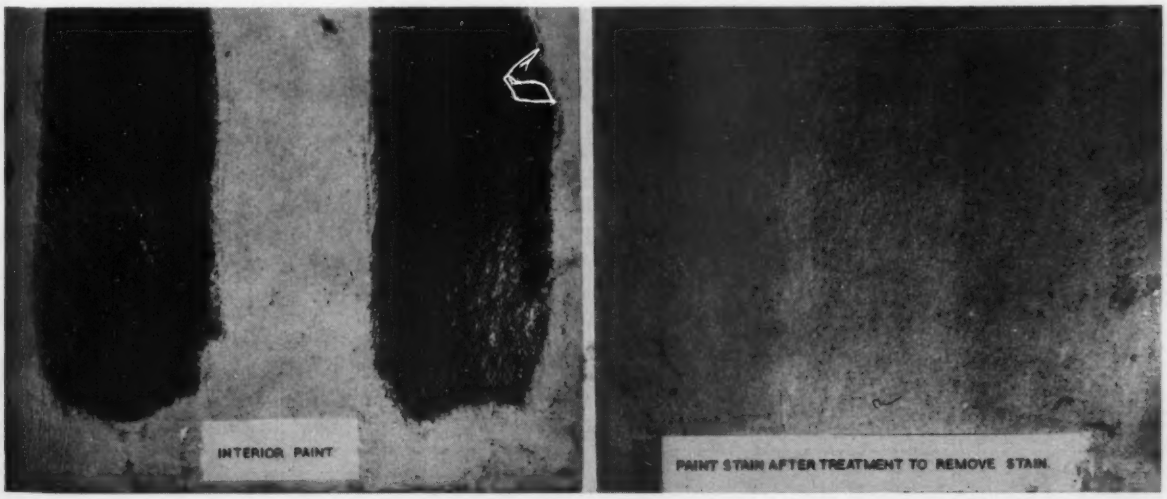
Some general advice on procedure and precautions may save the reader from having to learn by experience. All of the chemicals mentioned are readily available, and under normal circumstances can be used both indoors and outdoors without danger. They are not, of course, the sort of materials one should splash around in one's lunch pail. Washing the hands thoroughly after use, and, if fuming should occur, adequate ventilation are the only two elementary safety precautions which need be taken. After the stain has been removed it is good practice to wash the area copiously with clean water to remove any residual contamination or particles of filler, and to be certain that no soluble and possibly detrimental salts remain on the concrete.

The techniques quoted are basic for the materials causing the stain; obviously in practice many variables can be involved. It is therefore advisable to study the material carefully and to plan the cleaning approach to be used before actually starting to remove the stain. Improper materials and/or techniques often result in spreading stains over larger areas than were originally involved. The best method is to prepare a small trial quantity of the removing agent and to apply it at the most inconspicuous point to assess its value. The composition or strength can then be varied appropriately. This trial-and-error approach applies particularly to the fillers used to form a paste. Different fillers have varying effects on the workability of the paste, and varying abilities to cling to vertical surfaces. The condition of the surface will also influence the application.

On old concrete it is important to realize that accumulated dirt also disappears when stains are removed. A limited clean area in a sea of darkened concrete may in effect seem just like another stain. Time, however, will usually solve this problem.

The procedures given are the most effective and efficient that have been found for field use. By all odds the best technique to use against stains is to prevent them, and therefore the methods described here must be regarded as second best. END

Figure 5. Paint effectively removed by commercial paint removers followed by scrubbing.



Carpenter has fastened line to plywood deck form, is pulling it from under previously poured deck (beyond wooden barricade) into position for northbound deck to be built. Form, after bond with concrete of far lane is broken, drops onto lower flanges of 7-inch I beams, and slides along those flanges into position. Use of sliding forms saved contractor at least 15 days. After form has been skidded into place, carpenters on scaffolding under the bridge will chock it up into place, snug against upper flanges (see secured forms behind man).

SLIDING DECK FORM PANELS CUT 15 DAYS FROM SCHEDULE

AN ALERT CONSTRUCTION SUPERINTENDENT'S INGENUITY paid off handsomely in savings of time and money on the recent construction of the concrete deck for a highway bridge from Portsmouth to Kittery, Maine. Facing the urgent need to restore at least one lane of the heavily traveled bridge to traffic as quickly as possible, he wisely studied the project with a view to reducing forming time.

The solution was found in the fortunate circumstance that the transverse beams for the deck extend in unbroken single lengths across the five longitudinal stringers which carry the weight of the truss spans. The deck for one lane was accordingly formed with ¾-inch plywood panels, stiffened by two by fours. Built just wide enough to ride the flanges of the transverse I beams, and about 15 feet long (half the bridge width), the form panels were wedged into place from below against the top flanges of the beams.

After one lane of the project had been completed, the wedges holding the form panels in place were pulled, the bond broken, and the panels dropped down onto the lower flanges of the beams. The panels were then simply skidded across the span, one man pulling panels one at a time from above with a light line wrapped around a nail in the form.

It is believed that this single expedient saved about 15 days of forming time on the project, in addition, of course, to providing a simple and efficient means of accomplishing double use of the plywood. Additional time was saved on the project by the use of prefabricated welded wire fabric sheets instead of individually placed and tide reinforcing bars. END

Owner: Federal Aviation Agency; **Consulting Engineer:** Ammann & Whitney, New York, N.Y; **General Contractor** runways and turnoffs: C. J. Langenfelder & Sons, Inc., Baltimore, Md.

Concrete at new Dulles International Airport, Chantilly, Virginia, was centrally mixed and carried to the site in dumpcrete trucks.

High Speed paving with PLASTIMENT

Concreting the two-mile runways at the huge new Dulles International Airport near Washington, D. C., presented two major problems to the paving contractor: (1) limited workability at specified water cement ratio, and (2) rapid surface drying at high summer temperatures. Anticipating these problems, the consultants specified a retarding densifier to be used in variable proportions.

Plastiment Retarding Densifier produced the needed workability at 1-1/2" slump. Rapid, clear-water bleeding eliminated premature drying and provided sufficient moisture at the surface of the slab for proper finishing.

Compressive strength developed rapidly, averaging 2300 psi at 24 hours and 4200 psi in 3 days.

Plastiment features are fully detailed in Bulletin PCD-59. Ask for your copy. Offices and dealers in principal cities; affiliate manufacturing companies around the world. In Canada, Sika Chemical of Canada, Ltd.; in Latin America, Sika Panama, S. A.

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ENDS HAND-TAMPING! IMPROVES SLAB QUALITY

PROVED BEST: Rollerbug® depresses large aggregate to leave a thin 1/32" to 1/16" layer of fat on the slab for ideal finishing or a key for two-course work.

LEVELS AS IT ROLLS: The 36" wide, 5" diam. rollers level the slab as they depress aggregate! No other tool does this.

ENDS WADING IN THE MIX: With 6' or longer magnesium extension handle you "roll" the slab from the side. Works quickly, like a float.

TROUBLE FREE: No moving parts but the rollers. Saves its cost in labor on the first few jobs.

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

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Order Direct from us . . . Or your Favorite Goldblatt Dealer

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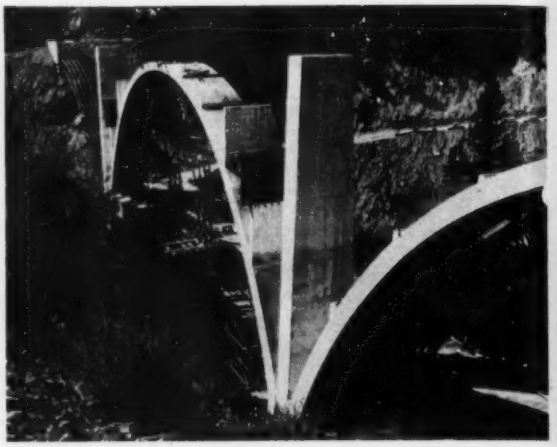
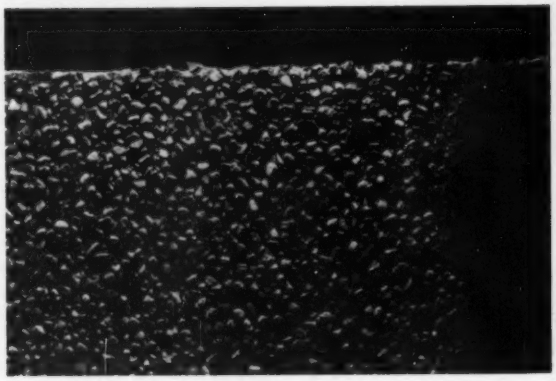


concrete arches river

Feather River, Calif.—This 1,000-foot bridge, located at the bottom of the Feather River Canyon will have accounted for 16,000 cubic yards of concrete. When completed, the bridge will consist of three 150-foot high arches and a 20-foot wide deck. To get to the bridge site, at a bend of the river between two sheer cliffs, the contractor, Pacific Bridge Company, had to carve a mile-long road out of the side of a mountain and construct a 30-foot high work trestle across the river.

CERESIT new products



exposed aggregate

A retarder for making exposed aggregate concrete can be applied to the surface of freshly placed concrete or to the formwork before placing. Retarder does not hinder the hardening of the concrete mass while chemically retarding the set of ⅛ inch of mortar at the surface. After 12 to 24 hours the retarded surface is washed away with a jet of water. Greater depths than ⅛ inch of retarding requires a heavier application. Material leaves no discoloring film on the surface. Ceresit Corp., 3227 Shields Ave., Chicago 16, Illinois.

Anthony Chronis, (left) President, Lisle Electric, Inc., Lisle, Ill. talking to Al Jones, his Dodge Representative on a job site.

"Dodge Reports saved our business in its early days ...today, they give us 1/3 of our volume"

"Shortly after I took over this business, we lost an account that represented 50% of our volume," says Mr. Chronis. "We had to round up a corresponding amount in a very short time in order to remain in business at all. We did it through Dodge Reports which we had never used before."

"For the first three months of our subscription," Mr. Chronis explains, "we conducted an intensive promotional campaign based on Dodge leads. It was so successful that after those first three months we had all the business we could handle."

Mr. Chronis began with three men and three trucks, and restricted his contracts to residential construction. "Today," he says, "we have 10 men, five trucks and a trailer. We handle stores, houses and apartment buildings and are beginning to establish our reputation in electrical heating work, engineering and quality custom installations. Last year we completed more than $160,000 worth of contracts, $50,000 of which we picked up solely through Dodge information."

Mr. Chronis goes through each day's Dodge Reports himself, and carries the ones he wants to bid on in his car. When he passes a prospect's site, he says, "I stop the car, walk through the mud and see the contractor on the spot. That's where I can sell our services, because Dodge Reports have told me all I need to know about the job. And, whenever our name appears in Dodge Reports to show that we've been awarded a contract, we feel that it's the best advertising our company can get anywhere."

Dodge Reports can help you get the new business you want, too—for only a fraction of the profits they'll help you earn. Send the coupon for further details. Or, consult your telephone directory for the Dodge office (in over 80 principal cities) nearest you.

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the big break-through in concrete handling:

Morgen Conveyors Handle 40 Yards of Concrete per hour Day In and Day Out!

More Concrete than a Crane with ¾-Yard Bucket —at 1/10th the equipment cost—with fewer men

MORGEN Idler Roller Hydraulic Drive Conveyor

The only contractors who still think "conveyors aren't for concrete" are those who haven't seen a Morgen in action. Once they see 550 yards in one continuous 15-hour pour, once they talk to men who've used Morgen conveyors for years, once they see the savings in cost and manpower, they get themselves converted!

Here, for the first time, is a conveyor designed from the ground up for concrete, eliminating the bugaboos of early belt conveyors. The direct-coupled hydraulic drive gives complete control, free of adjustments, immune to operator negligence.

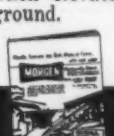
Easily Moved About on the Job

A balanced design lets Morgen build a heavy duty conveyor that is light enough to move easily on the job, even when elevated to 45° or on muddy ground.

Choice of Lengths and Styles

Morgen Conveyors are fully portable in lengths up to 48', discharging up to 33' high. In addition to the self-training idler roller conveyor shown, a lower cost pan-type conveyor is available with all the Morgen features and reverse drive as well.

Belt and idler width is matched so material wider than the belt can be handled.



WRITE FOR LITERATURE OR DEMONSTRATION

MORGEN MANUFACTURING CO.
DEPT. C YANKTON, S. D.
The makers of Morgen Adjustable Masonry Scaffolding

Design and Construction of Ports and Marine Structures. *By Alonzo DeF. Quinn. Published by McGraw-Hill Book Company, 330 West 42nd Street, New York, New York. 550 pp. Illus. $16.00.*

Written to provide a broad coverage of the civil and mechanical engineering aspects of ports and marine structures of all types, this book furnishes a useful tool not only to engineering firms, constructors, port authorities and government agencies, but to industry in general, particularly industry connected with the mining and shipping of raw materials.

Included is material on port growth and development, port design, breakwaters, piers, wharves, bulkheads, port buildings, material handling equipment, oil terminals, mobile docks, drilling and radar platforms (Texas islands), and navigation aids. The book contains numerous worked-out design examples showing how ports and other marine structures are planned and designed. A variety of construction methods are illustrated with photographs and drawings. Worked-out design problems give detailed steps for the reader to use in his own designs. A new and simplified approach to the design of piles and up-to-date details of new ships that require special port facilities are included.

ASTM Standard on Mineral Aggregates and Concrete. *Published by American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania. 396 pp. $5.75.*

Sponsored by Committee C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials, this book includes all of the standards pre-

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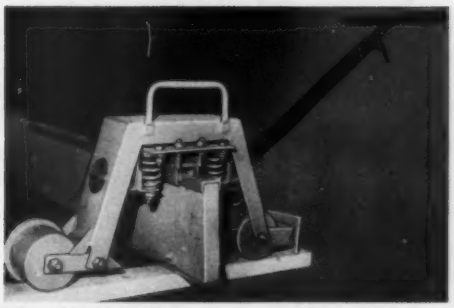
gives you these *Plus* BENEFITS

- ★ Engine can be started and warmed up with vibrator disengaged.
- ★ Centrifugal clutch allows engine to idle — No unnecessary starting or stopping.
- ★ Remote throttle control permits operator to select desired vibrating frequency from 4000 to 8000 vpm, without moving away from pull handle.
- ★ Vibrates and semi-finishes concrete while striking it off — ALL in ONE operation.
- ★ ALL Vibration is in the beam — Springs isolate engine and end dollies.
- ★ Custom-made Beams up to 60 feet long with any crown can be furnished. Standard Beams are straight.
- ★ Only Screed Beam utilizing Laminated wood. It is stronger, more rigid, less apt to warp, and lighter in weight than solid wood or metal screed beams.
- ★ Dolly rollers have removable flanges for use on adjacent slabs.
- ★ End dolly design permits 8' variable width adjustment quickly, even while operating.
- ★ Telescoping handles provide adjustable height to suit operator.
- ★ Unique clamping design of beam in end dollies permits fine vertical adjustment. Vibration of forms is eliminated.
- ★ Enclosed dual V-Belt drive, Less downtime.
- ★ Retractable form scraper — Keeps forms clean for easy forward movement of Screed; automatically raises when backing up.
- ★ Pick-up handle on each dolly makes it easy to lift and carry.
- ★ Electric motor can easily be substituted for gasoline engine. Holes in plate are drilled for both.
- ★ Power Unit, End Dollies and Screed Beam can be purchased separately.

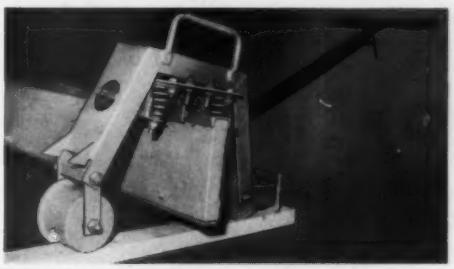
WHERE TO USE IT:

• Bridge Decks • Building Floors • Precast Concrete Slabs • • Prestress Concrete Slabs • Concrete Driveways • • City Streets • Highway Intersections and Approaches •



SPRING MOUNTING

Spring mountings isolate the end dollies from vibration. Vertical adjustment of beam keeps it from vibrating the forms. Whether striking off or backing up, the screed moves easily along on four rollers — two on each dolly.



EASILY RAISED FOR BACKING UP

Downward push on the pull handles causes the rear rollers to swing forward — automatically placing the beam in "raised" position for backing up. Then a pull on the handles moves the rollers back and up, placing the beam in normal operating position.

WRITE FOR COMPLETE INFORMATION — or call your nearest MAGINNISS Distributor. He's listed under "Contractors Equipment" in 85 principal cities.

Maginniss HI-LECTRIC VIBRATORS

MAGINNISS Power Tool Company
154 Disti Avenue, Mansfield, Ohio

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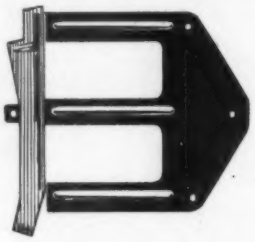
SAFETY IN STRENGTH

WORLD'S LARGEST STOCK OF VARIED ITEMS FOR CONCRETE CONSTRUCTION



VINES WALER BRACKET

The MODERN method of supporting walers on wood forms designed and engineered to give maximum performance and safety.

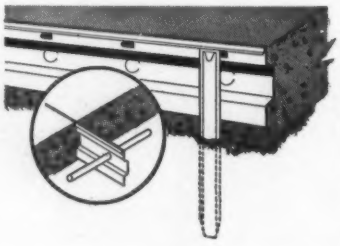
Vines Waler Brackets successfully support, space and retain walers independently of wall ties or clamps without toe nailing to studs and meet the requirements of the contractors and the safety engineer.

BURKE HANDY REEL

- Solid continuous aluminum frame.
- Self locking pin.
- Reversible belt loop for right or left hand workers.

Finger tight screw means:

No wrenches to use . . . no parts to lose . . . no threads to strip. Easy to rewind.



KEYED KOLD JOINT FORMS

A new concrete construction product that serves as form, screed, and true cold joint, left permanently in the concrete floor slab. The use of Keyed Kold Joint eliminates spalled joints . . . produces a cold joint structurally sound and architecturally beautiful. Keyed Kold Joint also eliminates costly make-up and stripping of split forms for checkerboarding. Saves up to 35% in cold joint form costs . . . results in neater, uniform joints.

TO ORDER ANY OF THE ABOVE ITEMS OR FOR FREE BROCHURES & SPECIFICATION SHEETS USE COUPON BELOW.

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☐ 3. Keyed Kold Joint Forms

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books

pared by Committee C-9, but only those for aggregates and other selected highway materials developed by Committee D-4. In addition it contains pertinent specifications for cement which are under the jurisdiction of Committee C-1 on Cement.

Standard specifications, methods of test, recommended practices and definitions of terms for mineral aggregates, concrete, concrete curing materials, expansion joint fillers, reinforcing steel, paving block and brick, and bituminous and non-bituminous road materials are included.

This book should prove useful to producers and consumers of mineral aggregates, concrete, and highway materials, as well as to specification writers, testing and inspection personnel, highway departments, and to research and engineering institutions.

Concrete and Soil-Cement Roads. *By W. P. Andrews. Published by Contractor's Record Limited, Lennox House, Norfolk Street, Strand, London, W. C. 2. 157 pp. Illus. $5.00.*

The various methods of using concrete and cement in road construction are the subjects of this book. Foundations, bases, surfacing, soil stabilization, roads for tank traffic roads on peat, prestressed roads and grouted roads are all discussed.

Construction details for both manual and mechanized processes are given adequate treatment. While the book deals with everyday practical problems the theoretical side of road design has not been neglected; the arguments on controversial points are well developed. A comparison of theories and practices on road work in England, continental Europe, and the United States is included.

Tips On Building Watertight Concrete Structures

The increasing use of concrete for swimming pools, basement playrooms, industrial sub-surface garages and similar structures continues to reflect the growing interest in watertight concrete. Moreover, of the many questions asked Alpha Field Engineers, those about watertight concrete today are one of the most common.

Watertight concrete can be produced without undue difficulty when proper emphasis is placed on good design, good concrete and good workmanship. Extensive testing and careful examination have revealed that the most common reasons for leaky concrete are **inferior workmanship, poor materials and too lean a mix.**

Good Concrete:

Modern ready mix concrete plants today are equipped to furnish concrete of the very highest quality, but the user must specify the mix and make sure the concrete is not ruined on the job by someone insisting on additional water. The most modern mixing plant, the best materials and the best mix design mean nothing when the water content is not controlled and the concrete is improperly placed and cured.

The Right Mix:

Use a quality concrete mix and place it in even layers not more than 18 in. deep. Avoid honeycombing by adequately spading or vibrating each layer.

Experience has indicated that for such structures as tanks and reservoirs the concrete should contain not more than 6 gal. of water per sack of cement. For concrete in very heavy sections such as dams, the water may be increased to 7½ gal., while for thin sections it should be reduced to 5 gal. These amounts include the water which is introduced as surface moisture in the aggregate. Coarse aggregate usually contains little if any moisture, but the sand often contains a considerable amount of water.

Avoid Segregation in Placing Concrete:

Concrete should be delivered at a number of points around the form to avoid chuting over long distances. This prevents segregation, a source of possible leaks.

Of all the steps in watertight concrete work, handling, placing and compacting in the forms are among the most important. Concrete should not be allowed to drop freely more than 5 or 6 feet, as segregation is likely to occur if it falls through a greater distance. Flat chutes should not be used even for short distances. **Chutes should be deep with rounded bottoms, and constructed of or lined with metal.** Buggies should be operated on smooth runways. Buggies equipped with pneumatic tires reduce segregation. Dumping a large quantity of concrete in one place and then causing it to flow horizontally over a long distance in the form is not good practice and should never be done. Concrete should be distributed by placing in uniform layers 1 foot to 18 inches thick, spading or vibrating each layer to consolidate the concrete.

Construction Joints:

One of the frequent sources of difficulty has been at construction joints. Wherever possible, the work should be so planned that placing of concrete will be continuous. In large structures expansion joints are sometimes provided, but placing should be continuous between joints. Where a construction joint must be made, precautions should be taken to secure good bond between the layers. If the structure is to be subjected to water pressure such as in a tank and if a construction joint is to be made between hardened and fresh concrete, a waterstop should be installed.

Curing:

Keeping the concrete wet for at least 7 days when normal portland cement is used, or 3 days if high-early strength portland cement is used, should be required on all watertight construction.

Surface coatings are helpful in overcoming leakage on some structures, but cannot be expected to overcome faulty joints or defective areas. An effective surface treatment is the application of a grout of equal parts portland cement and fine sand mixed to the consistency of paint and applied with brushes. The concrete should be damp when this is applied and the coating should be dampened as soon as the cement has set sufficiently so that it will not be washed off. It should be kept damp at least 24 hours.

Use whitewash-size brush to apply surface coating.

More Information

Your Alpha Field Engineer can answer your questions on watertight concrete construction and help with any other problems involving the use of Alpha cement. Reprints of this advertisement are yours for the asking.

ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.

Proved Cost Saver

CURE and SEAL CONCRETE WITH 1 PRODUCT

THOMPSON'S WATER SEAL

Eliminates wet sacks, papers, hosing and spraying

Spray deep penetrating, colorless Thompson's Water Seal on fresh concrete to cure and seal in one operation. Save time . . . save labor.

Effectively controls moisture loss for 28 days and beyond.

Assures uniform curing even in hot, dry weather.

Helps reduce checking, cracking, spalling.

Produces harder, dust-free surface.

Eliminates waterproofing concrete floors.

Permits adequate time for smooth troweling.

Send for technical bulletin and Contractors Case History file.

A proved bond breaker for pre-cast, tilt up and lift slab construction. Permits easy, clean separation of slabs, walls, pre-cast members.

Available in 5 and 55 gallon drums from building supply stores, paint and hardware dealers.

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Thompson's

MANUFACTURERS OF FINE PROTECTIVE CHEMICALS SINCE 1929

E. A. Thompson Co., Inc., Merchandise Mart, San Francisco 3, California

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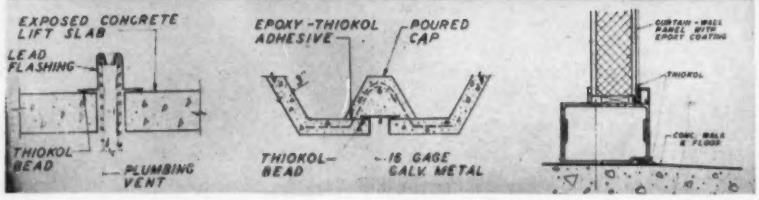
roof curves, and then some!

Weeki Wachee Springs, Fla.—One way to get the public to notice a concrete roof, especially a curved job like this one over an underwater swimming theatre, is to decorate it with more curves. The 19 barrel units in this spectacular job recede from a frontal radius of 3 feet 3 inches to 2 feet 6 inches in the rear of the structure. They are 33 feet long.

Instead of double forming the units, the concrete was worked and finished to the slope with a resultant significant reduction in cost. The theatre roof system is visible from the highway and provides a unique billboard to advertise the water show. Now about those *other* curves . . .

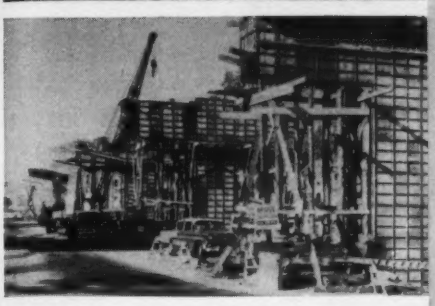


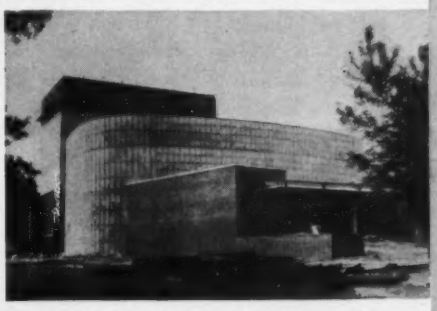
epoxies at work

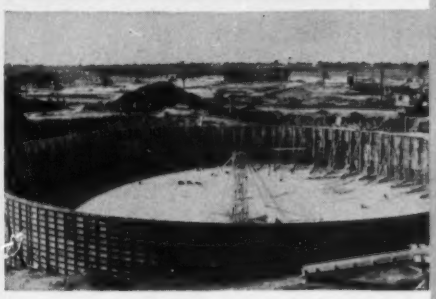
Pompano, Fla.—Waterproofing with an epoxy coating and the use of Thiokol-based sealants are among the factors credited with helping to achieve a $12,000 saving in the construction of the contemporary Charles Drew school.

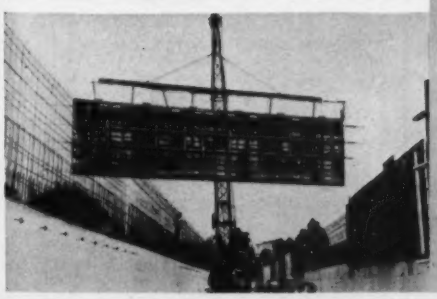
Where the thin folded-plate roof sections meet, a galvanized plate was set in a bead of Thiokol-based sealant on the upper side of each slab edge. Reinforcing rods extending from each plate were lapped and a concrete cap was cast over the joints to protect the reinforcing. A strong bond between the cap and the slab was assured by the use of an epoxy adhesive.

The folded slabs were cast on grade, covered with water for seven days to produce impervious concrete, and then lifted into position. Waterproof surfaces were obtained without conventional roofing through the application of a heavy-duty epoxy coating.









CONCRETE FORMING PROBLEMS

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BY RENTING **UNI-FORM PANELS**

Over the years thousands of contractors have rented UNI-FORM Panels to form concrete and save money on almost every conceivable type of job, from house foundations to mammoth industrial projects. Renting UNI-FORM Panels is simple . . . You send us a set of plans and we will send you a rental proposal based on what you would need. You will get a tailor-made forming system delivered to your job. But the big advantage is that you will be able to use a forming system that will out-perform any other method you might use. Write today for the complete story on UNI-FORM Panels or send us a set of plans; either way we will be glad to hear from you.

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BRANCH OFFICES and WAREHOUSES:
ATLANTA BALTIMORE CLEVELAND HOUSTON
LOS ANGELES SAN LEANDRO TORONTO

portable concrete conveyor

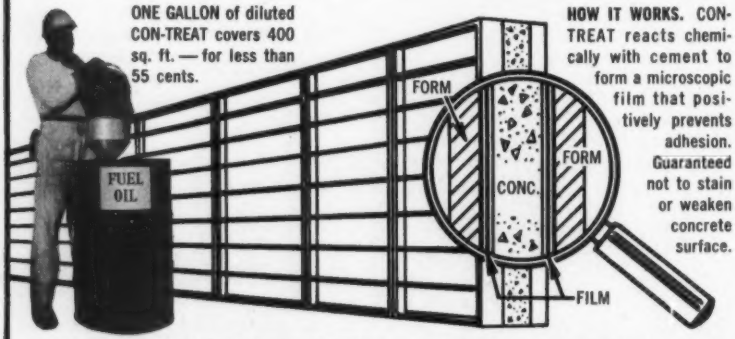
Primary applications of this belt conveyor are to bridge over or under obstructions, and to elevate concrete into forms or hoppers. The machine can place 40 yards of concrete per hour to heights of 22 feet and can handle forms and reinforcing steel as well. This idler roller belt is virtually maintenance-free since all rollers are equipped with sealed-for-life ball bearings which keep the belt running straight in spite of uneven loading. These self-training idler roller conveyors are fully portable in lengths up to 48 feet, discharge up to 33 feet. Morgen Manufacturing Co., Dept. C, Yankton, South Dakota.

field office

An expandable field office is constructed of heavy-gauge steel that has been bonderized and zinc coated to assure years of weather protection. The basic unit measures 8 by 11 feet at the eaves. Clear inside headroom 6 feet 5 inches, height at peak 7 feet 3 inches. Doors open to a width of 72 inches. Units may be purchased in multiples as desired, with double doors in one end or both ends and with or without windows. Write Pennington Mfg. Co., Addison, Ill.

transfer trailer

A hydraulic powered transfer trailer is engineered to work with any standard 10-wheel dump truck and can dump anywhere a dump truck can work. One dump truck and one driver teamed with the trailer can haul and dump two loads instead of one. Together the truck and transfer trailer have a combined legal payload in excess of 26 tons. For further information write to Challenge-Cook Bros., 3334 San Fernando Road, Los Angeles, Calif.


ONE GALLON of diluted CON-TREAT covers 400 sq. ft. — for less than 55 cents.
FUEL OIL
FORM
CONC.
FORM
FILM
HOW IT WORKS. CON-TREAT reacts chemically with cement to form a microscopic film that positively prevents adhesion. Guaranteed not to stain or weaken concrete surface.

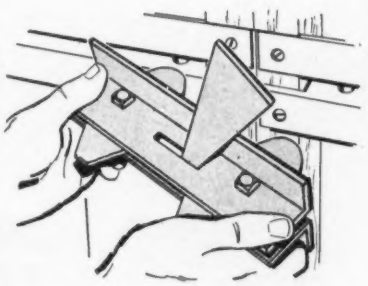
STRIP FORMS IN HALF THE TIME... AT HALF THE COST... WITH

new CON-TREAT

Here's why concentrated CON-TREAT is your best buy in a form treatment and release agent:

1. **YOU SAVE MONEY.** CON-TREAT costs half as much as other "quality" release agents; goes *three times* as far as "cheaper" substitutes. Mixed with low-cost fuel oil or kerosene, costs less than 55¢ per gal. *delivered!*
2. **YOU SAVE TIME.** Strip faster, and reuse forms immediately without cleaning. CON-TREAT is easy to mix, easy to use. Sprays on. Concrete surface comes out clear, white and unstained.
3. **YOU SAVE YOUR FORMS:** because CON-TREAT *prevents rust* and eliminates damage caused by constant cleaning. Special ingredient also removes old, hardened concrete. Equally effective on scaffolds, mixers, wheelbarrows and other tools. Send $1.00 for 5 gal. trial order. E-10

EDICK LABORATORIES, INC. 2358 S. Burrell St. Milwaukee 7, Wisconsin



pivot action form clamp

A new form hardware unit, the KWIK-LOCK clamp, is said to simplify concrete forming through a pivot action adjustment. All parts are interchangeable and the only tool required to set up the system is a hammer. Each steel clamp is self-adjusting, making it possible to join panels on waler pins quickly and with assurance that they will be properly aligned. Kwik-Lock Form Company, 18100 Rialto, Melvindale, Michigan.

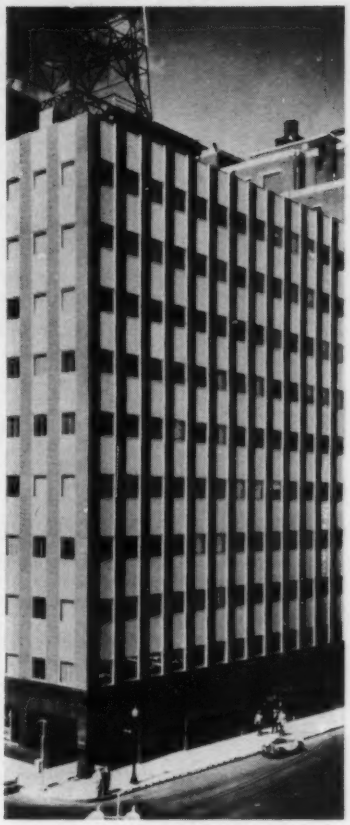
SEALTIGHT® Premoulded Membrane
TRADE MARK
VAPOR SEAL

• The Methodist Country House, Wilmington, Delaware. Architects: Dollar, Bonner, Blake and Manning, Wilmington, Delaware.

• West Penn Power Company, Connellsville, Pa. Architects: Hoffman and Crumpton, Pittsburgh, Pa.

• Federal Low Rent Public Housing Project, Elberton, Ga. Architect: James M. Hunt, A.I.A., Elberton, Ga.

• Harris Trust and Savings Bank, Chicago, Ill. Architects: Skidmore, Owings and Merrill, Chicago, Ill.



• Northwestern Bell Telephone Company, Des Moines, Iowa. Architects: Tinsley, Higgins, Lighter and Lyon, Des Moines, Iowa.

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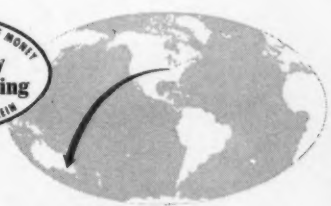

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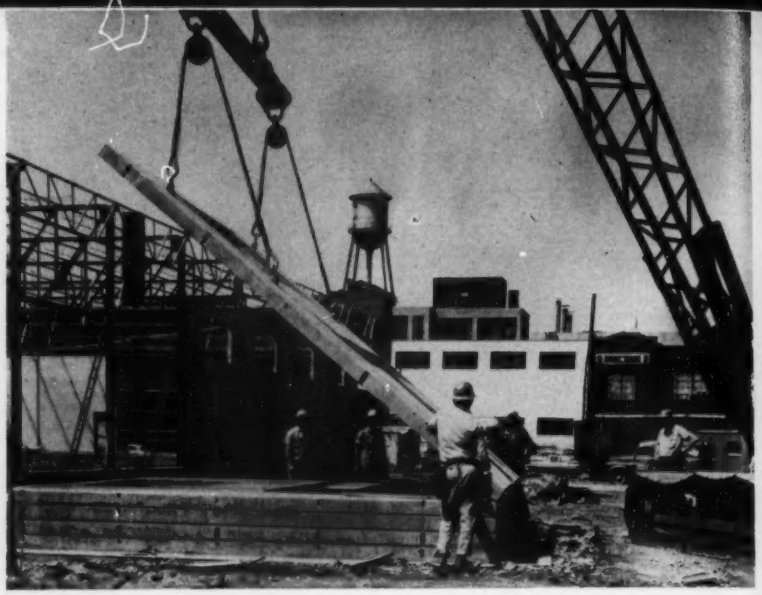
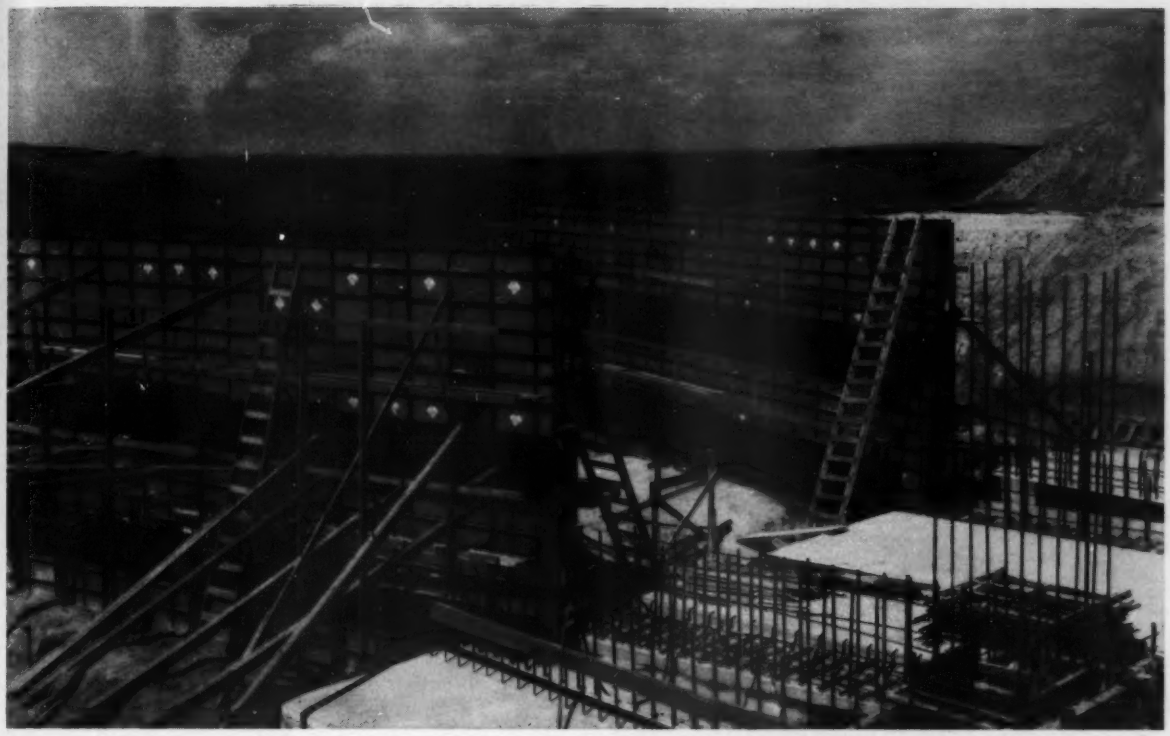


tilt-up wall

Chicago—The Worsham Construction Company utilized tilt-up concrete wall construction for a warehouse for the White Motor Company. The 30 panels needed for this building were cast one on top of another in stacks conveniently located around the building site. A 3-inch casting pad, somewhat larger than the panels, was set down before the first panel was cast. A parting compound separated the panels. Fir forms, 2 by 6, were built for the first panel in each stock for the second panel, 2 x 12 forms were used. These forms were lifted upward as ensuing panels were cast.

airlifting concrete

Santa Ana, Calif.—An HUS-1 helicopter from Marine Helicopter Squadron 363, Marine Corps Air Facility hovers over a concrete hopper while ground crewmen make the hook-up at the Black Star Canyon Rough Area Landing Site. The helicopter airlifted more than 6,000 pounds of concrete from this central location to five other Rough Area Landing Sites in the Cleveland National Forest for the installation of 40-foot steel windsock masts. After the hopper was filled from a truck mixer, the concrete and ground hook-up crews were flown to the high ground where the poles were to be erected.



Operational Missile centers at Offutt Air Force Base.
J. Hilding Johnson, Inc., Gary, Indiana, contractor.

Symons Steel-Ply Forms Solve Missile Base Problems

Winter weather didn't stop J. Hilding Johnson, Inc., Gary, Indiana, contractor for the three operational Missile centers at Mead and Arlington, Nebraska, and at Missouri Valley, Iowa. Subbing 36,000 cubic yards of concrete work from prime contractor Malan-Groves, Johnson was prepared for winter, and shoved ahead its construction schedule to a 24-hour around-the-clock basis.

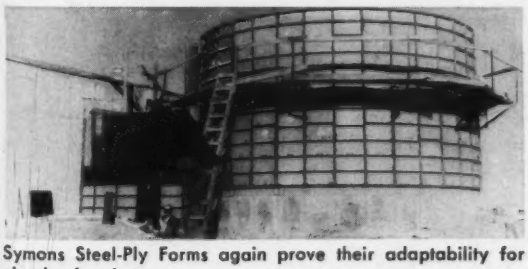
Symons Steel-Ply Forms were used to facilitate speedy construction and solve other contract problems.

Cut Over-All Costs

Direct number of carpenter hours in the field were reduced and administrative-wise, there were about 25 percent fewer men on which to issue checks, keep time records, and other necessary details.

Flexibility was Big Advantage

If weather interfered with a pour scheduled down in a hole, forming and concrete work still could proceed at some other location above ground.



Symons Steel-Ply Forms again prove their adaptability for circular forming.

Triple-Row Bracing or External Waling Eliminated

The corps of engineers required triple-row bracing or external waling on both sides. However, the corps gave permission to try one 25-foot-high wall, braced only on one side. Based on results, permission was given to use the system on the remaining work. Many man hours were saved. And the method cut weeks off the over-all construction schedule.

Eliminated Congestion At Job Site

Eliminating yard congestion at the job site was important, particularly during rainstorms and during the freeze-thaw cycles of early winter.

Complete Job Story on Request

There's much more to this job that was completed in 10 months rather than 2 years under normal conditions. Complete *Offutt Air Force Base Story* will be sent on request. Symons Steel-Ply Forms are rented with purchase option.

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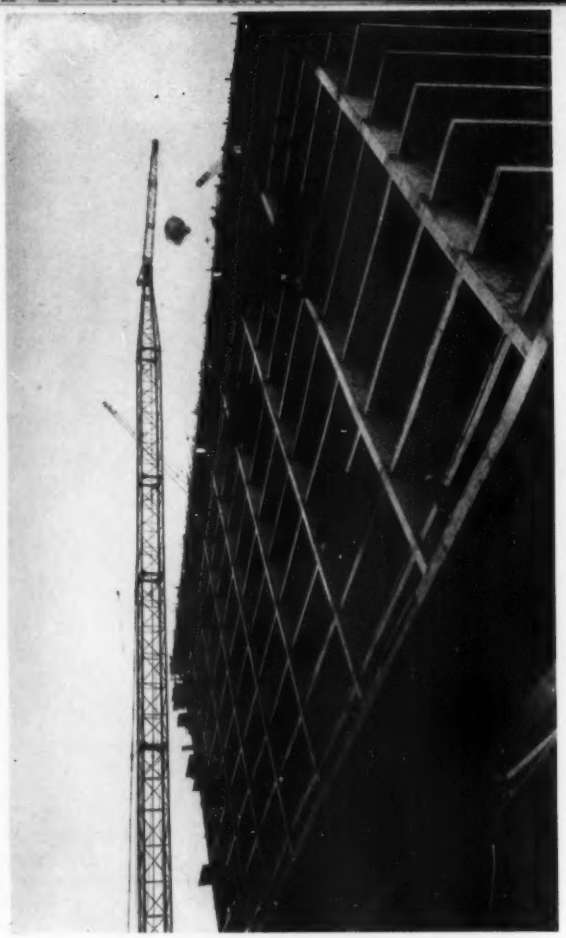


1

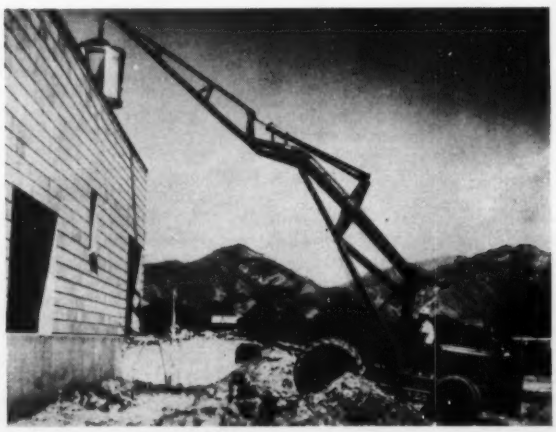
modern equipment solves tough placement problems

The economical placement of concrete in remote or difficult locations has received a great deal of attention from equipment designers in recent years, with the result that on many jobs the cost estimating concepts of even a decade ago are today almost obsolete.

Photo 1 on this page, for example, shows a modern P & H crane boom placing concrete on the 15th story of a cooperative apartment in San Francisco. This 80-ton giant mounts a 160-foot boom with a 40-foot jib. Equipment of this type is frequently available on a rental basis.

Photo 2 shows how a contractor in Salt Lake City solved the problem of placing concrete on the roof of a 1-story building rendered somewhat inaccessible by two open trenches flanking one entire side. The equipment used is an Economobile equipped with a hook and a crane-type bucket.

Photo 3 shows how the 48-foot reach of the telescoping boom on an Austin-Western 410 crane enabled the contractor on a bridge remodeling job to reach in through a maze of steel scaffolding to place concrete. This type of equipment can not only swing a full 360 degrees, but it can also be raised from horizontal to 360 degrees. The model shown has a capacity of 11 tons.



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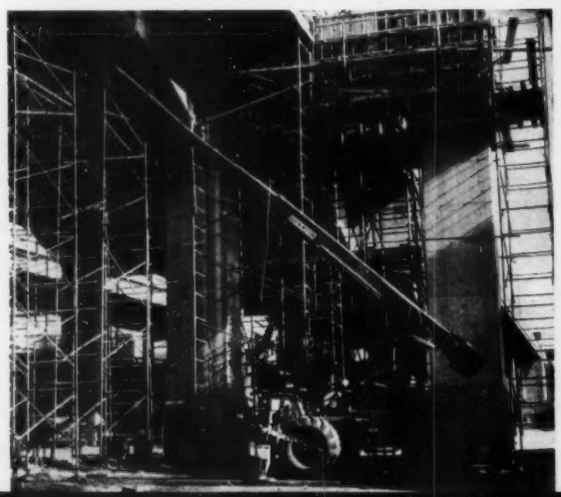

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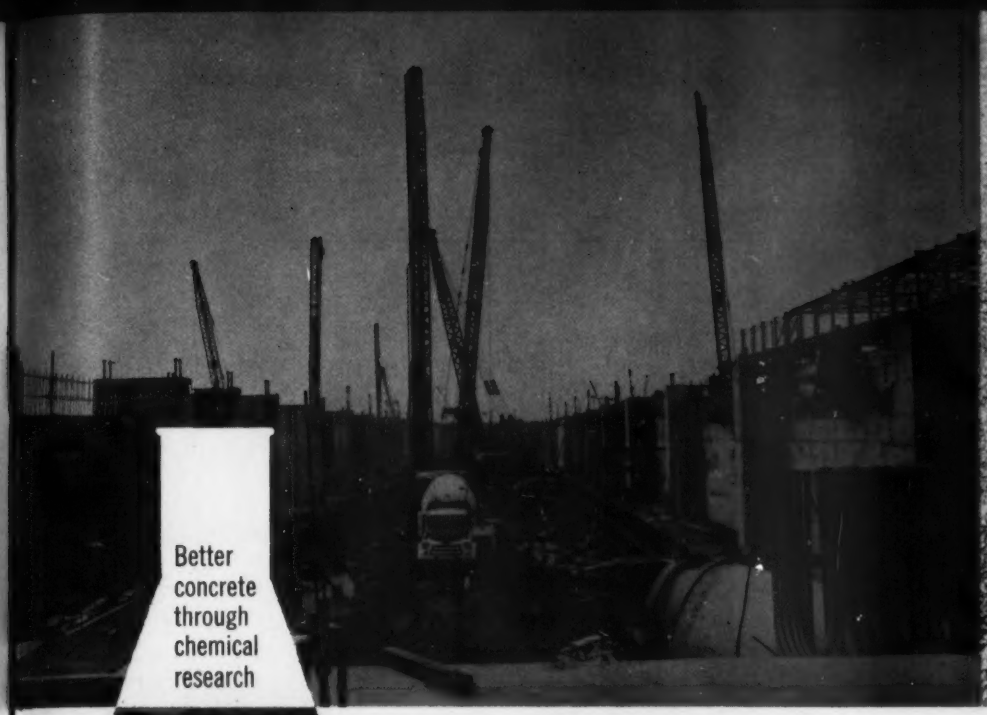

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New multimillion dollar Great Lakes Steel "Mill of the Future" takes shape at River Rouge, Michigan. Its length of 2,160 feet and total building area of 880,000 square feet call for over 125,000 cubic yards of high compressive strength concrete produced with blast furnace slag.

Reports of tests made by the Detroit office of Pittsburgh Testing Laboratory indicate a consistent strength level well above specified limits. Controlled water reduction with WRDA, Dewey and Almy's research-perfected chemical admixture was largely responsible for this result. WRDA increased finishing ease and boosted compressive strengths at maximum economy consistent with specifications. Another Dewey and Almy admixture, DAREX AEA, was specified for controlled air entrainment of concrete.

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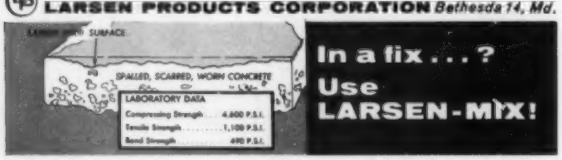
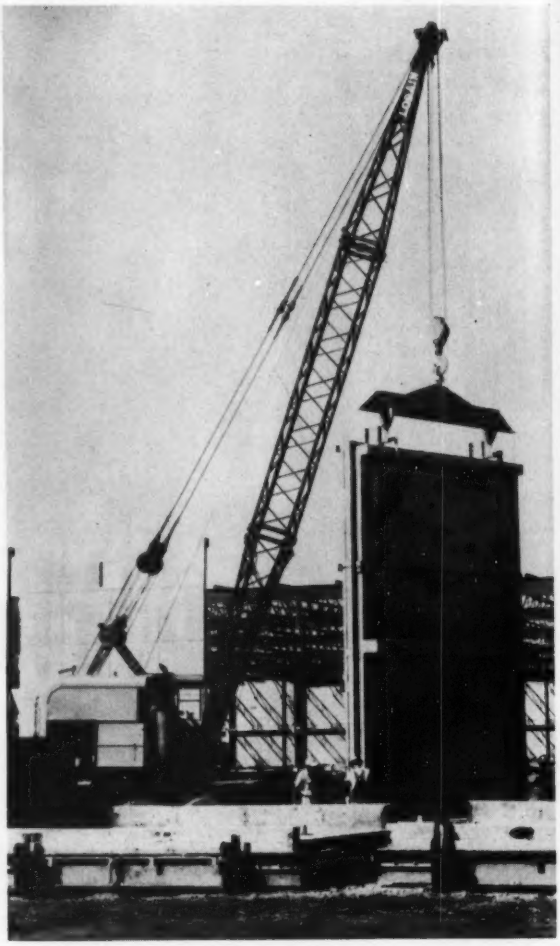




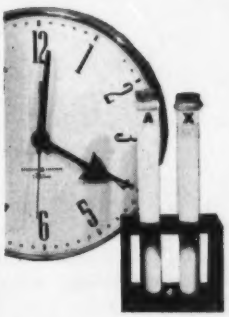
variation on tilt-up

Fort Worth, Texas—A construction concern has patented a variation on the conventional concrete tilt-up technique which is claimed to shave a dollar per square foot off the cost of erecting concrete buildings. Named Tilt Frame, the process was developed by the Garmon Construction Company of Fort Worth.

One of the features of the process is the elimination of the necessity for grade beams and flooring to be in place before walls can be set. Wall panels are cast in patented frames outside the building area and swung into position within 24 hours with the frames in place. As each panel is placed and braced the casting frame tilts away to facilitate removal.

In the construction of the 100,000-square-foot warehouse shown here, the Tilt Frame process is credited with reducing erection time from 60 to 11 working days. The process is said to be especially adaptable to small work crews with minimum experience. Franchises are available on an exclusive territorial basis throughout the United States.

products



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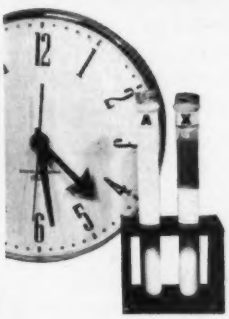

2

curing compound

A new compound for curing concrete contains an additive called "Suspensoid" which is said to make it possible to place pigment in suspension more readily and maintain it in suspension for a longer time than has been the case with other pigmented compounds. As a result less time is required to place and keep pigment in suspension, and more pigment actually reaches the concrete to facilitate curing.

In the unretouched photos above, Tube A contains concrete curing compound with "Suspensoid"; Tube X contains a standard type. Photo 1 was taken right after both tubes were shaken vigorously. Photo 2, taken just 27 minutes later, the pigment in Tube A still in suspension, while the pigment in Tube X has settled out.

The homogenized product is also reported to provide a very thin uniform film free of bubbles, and to keep spray nozzles unclogged. W. R. Meadows, Inc., 29 Kimball St., Elgin, Ill.

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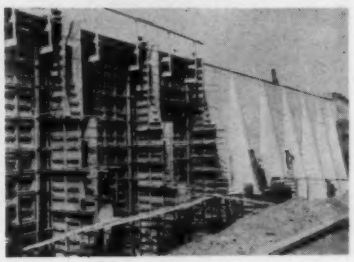

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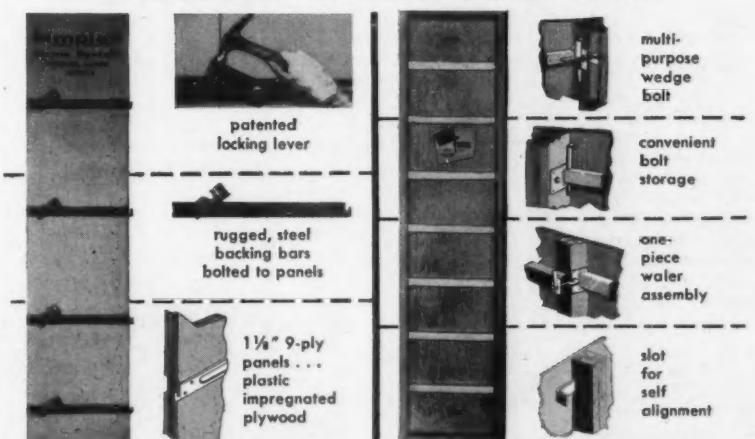
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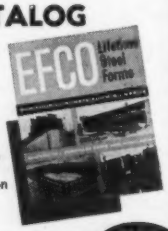

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problem clinic

EDITOR'S NOTE

Early issues of Concrete Construction included a regular column called Questions and Answers which fell by the wayside mainly because there was just not enough time available to give it the close attention it demanded. In reactivating the department under the new and perhaps more descriptive name Problem Clinic, we are taking into account a marked increase in correspondence with readers concerning every day questions that come up in the field.

We hope more readers, stimulated by the brief discussions presented here, will send in questions which can be dealt with in future columns. We will also welcome and publish, when space permits, correspondence designed either to take issue with or to expand any of the information presented in the Problem Clinic.

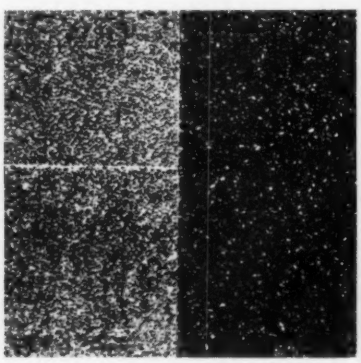
visibility table

Question: With normal eyesight, at what distances is it possible to see exposed aggregates in the surface of concrete?

Answer: The following table suggests maximum distances in feet for exposed aggregates of the several sizes, listed in inches:

AGGREGATES (INCHES)	DISTANCE (FEET)
1½	350
1	300
¾	200
½	115
⅜	75
¼	60

More important than the distances are such factors as the color contrast between the hardened paste and the exposed aggregate, the lighting conditions and depth of texture. The accompanying photos show examples of how coarse and fine grading affect the appearance of exposed aggregate surfaces.



polyethylene curing

Question: How do temperature ranges of concrete under polyethylene film compare with concrete under waterproof paper?

Answer: Tests by the New York State Department of Public Works showed only slightly greater temperature range under white opaque 4-mil polyethylene sheeting than under waterproof paper. But the temperature range under clear polyethylene was significantly greater than under paper. On the other hand, cores taken from polyethylene cured pavements showed somewhat greater average compressive strengths than cores taken from paper cured concrete.

weathering concrete

Question: Is there a practical procedure for imparting a weathered appearance to new concrete surfaces?

Answer: First wash the surface with a 10 percent solution of hydrochloric acid to remove the film of cement from the surface. Then wash the surface several times with a solution of water and carbon black pigment until the desired appearance is achieved.

effect of sugar

Question: How much sugar is required to keep concrete indefinitely in a plastic condition?

Answer: The amount of sugar that should be used to keep concrete from fully hardening ranges from 1.0 to 1.5 percent by weight of cement. It is important to note, however, that the effect of sugar is not to keep the concrete permanently plastic, but to keep its strength at a low enough level so that it can be easily broken up.

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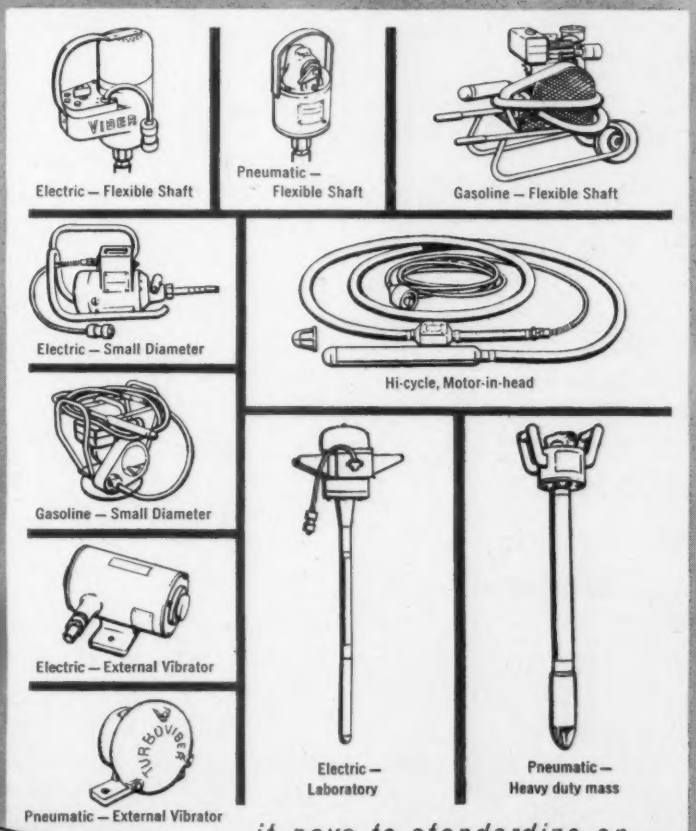

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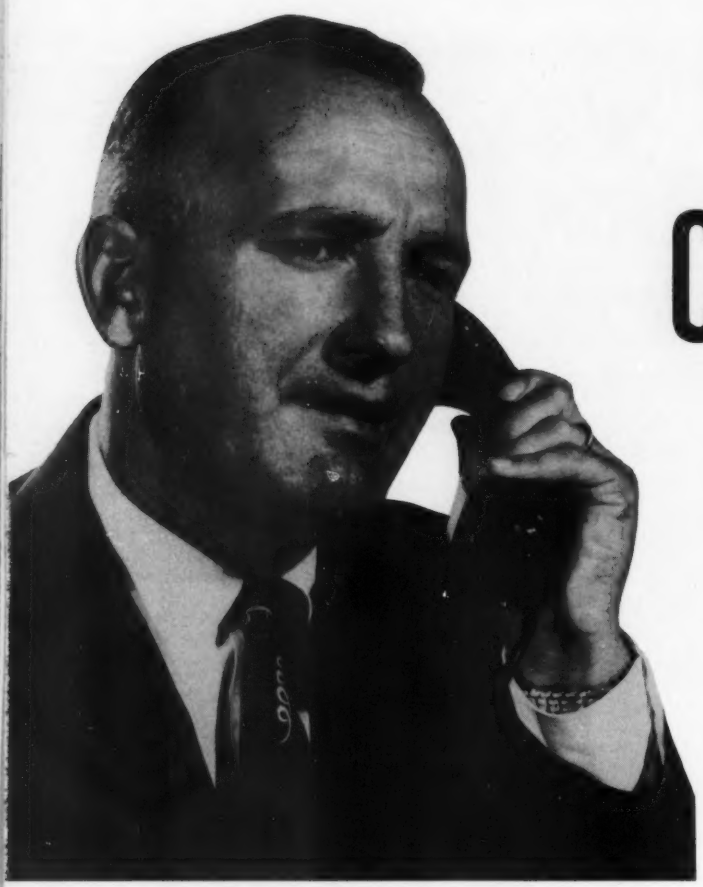

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Simplex Forms System, Inc. 153
5603 Industrial Ave.—Rockford, Ill. TRemont 7-1441

Symons Clamp & Mfg., Dept. E-1 ..... 149 & 154
Dept. E-1—4249 Diversey Blvd.—Chicago, Ill. DIckens 2-5141

E. A. Thompson Co. 144
1355 Market St.—San Francisco 3, Calif. UNderhill 3-1963

Tretol, Inc. 148
6051 W. 65th St.—Chicago 38, Ill. LUdlow 2-9292

Universal Form Clamp Co. 145
1238 N. Kostner Ave.—Chicago 51, Ill. CApitol 7-1600

Viber Company 155
726 So. Flower St.—Burbank 73, Calif. VIctoria 9-2365